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pleasure from angling them in every stream and lake which they can conveniently approach. And yet, it is no exaggeration to say that aside from some limited fish-hatching operations, we have done practically nothing to intelligently conserve these creatures for future generations.

Although there are a good many sides to the program of fish conservation, yet this evening I wish to bring to your attention only one phase of it, namely, fish-parasitism and point out some of the biological problems with which it is intimately linked up.

During the last few years I have been devoting a good deal of attention to fish-parasitism in the Northwest and can say that this is a field which has hardly been touched. There are great numbers of fish parasites in this region: *bacteria*, *protozoa*, *cestodes*, *trematodes* and *crustacea* which are infecting the fish and killing off great numbers of them. These afford many fields of investigation which are not only thoroughly scientific, but of great practical value. We need good taxonomic keys of these parasites, their life histories and their effects on the various hosts.

Furthermore, this knowledge should be supplemented by a careful study of the conditions within our lakes and streams which are conducive to fish-parasitism. At present we are working entirely in the dark, and as a result of it much of our good time, effort and money are wasted. I will cite but one instance along this line to make my point clear.

It is a common practice among our game commissioners to stock a body of water with fish and then to close it down for purposes of allowing the fish to multiply, with the view of obtaining a plentiful supply of spawn for hatching operations. My observations along this line have convinced me that this is an erroneous practice. In the first place, closing down a stream makes for a rapid multiplication of fish so that the available food supply soon becomes inadequate to maintain all of them. A fierce struggle for existence ensues in which many of the weaker, but nevertheless desirable fish are killed off. Even those that remain appear to be starved for lack of food. In the second place, the congested conditions within

the stream make possible a rapid spread of any parasitic infection which happens to make its appearance among the fish. And lastly, when a stream is closed down for any length of time its shores afford an ideal, undisturbed habitat for many fish-destroying birds and other animals. These not only kill off large numbers of fish, but they may also be the means of disseminating various parasitic organisms among them.

It seems to me that before we can even talk of cure and prevention, we must know the parasitic organisms as well as the conditions which make parasitism possible. But, without these facts we are powerless to do any good. What is greatly needed in this Northwest section is a number of biological surveys for the purpose of studying and mapping out the various ecological factors of the regions in which fish or game are to be planted. We ought to know a good deal about such factors as available food supply, oxygen content, temperature variations, predatory and parasitic organisms, etc., of a place before any kinds of animals or plants are introduced into it. Knowing these conditions we can then intelligently fit each organism into that particular environment where it will thrive best. While the initial expense involved in the establishment of such surveys will be considerable, yet the benefits derived in the long run will more than repay us for our efforts.

NATHAN FASTEN

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THE THIRD ASIATIC EXPEDITION OF THE AMERICAN MUSEUM OF NATURAL HISTORY

THE Third Asiatic Expedition of the American Museum of Natural History, in cooperation with the American Asiatic Society and *Asia Magazine*, will leave Kalgan on the nineteenth of April for the continuation of its work in Mongolia.

During the last six months field operations have been conducted in various parts of China which have been extraordinarily successful. All the members of the expedition's staff have now arrived in Peking and the final preparations

are being made for the coming summer's work.

The personnel consists of 25 men as follows:

Scientific Staff:

Roy Chapman Andrews, leader and zoologist.

Walter Granger, paleontologist.

Charles P. Berkey, geologist.

Frederick Morris, geologist and topographer.

J. B. Shackelford, cinematographer.

S. Bayard Colgate, motor transportation officer.

Persender, assistant transportation officer.

F. A. Larsen, field manager.

Native Personnel:

3 Chinese taxidermists.

3 Chinese cooks.

2 Chinese chauffeurs.

3 Mongol interpreters (Chinese-Mongol).

6 camel drivers.

AREA TO BE INVESTIGATED

Central and Western Mongolia from a line between Kalgan and Urga, west to the eastern extension of the Altai and Tian Shan Mountains and south to the frontier of Chinese Turkestan. This region, part of which lies between two old caravan trails, consists of the most arid section of the Gobi Desert, of rolling meadowlands and foothills at the bases of high mountains, some of which are covered with perpetual snow.

The Third Asiatic Expedition will carry on a reconnaissance of its zoology, geology, paleontology and geography. This survey will be preparatory to a more detailed study if the future of the region proves to be of sufficient scientific interest.

PLAN OF OPERATIONS

Due to the short summer advantage must be taken of the warm months when scientific studies can be carried on successfully. This is between April 15 and October 1. After these months snowstorms are of such frequent occurrence that effective work is difficult.

The expedition has purchased 75 camels which are already on their way to a point known as Turin, 175 miles south of Urga, transporting food, gasoline, motor equipment and scientific apparatus sufficient for six months. At Turin they will await the other members of the expedition.

On April 19 the remainder of the party will leave Kalgan in three Dodge motor cars and

two Fulton one-ton motor trucks. They will begin scientific work immediately after leaving Kalgan and proceed slowly to Turin to connect with the caravan. From Turin the caravan will be sent westward towards a region known as Sain Noin Khan. The scientific staff will follow in the motor cars. After proceeding for perhaps a hundred miles a camp will be made and the smaller automobiles will be utilized by the scientific party to carry on their work. Horses and camels will be used to explore such regions as can not be reached by the cars. After working in a circle about the first camp the scientists will move a few hundred miles further and the same method repeated. The geologist, paleontologist and topographer will occupy one car, the zoologists a second and the photographer a third. Each party will be a complete mobile unit equipped with its own cook, driver and assistants and can remain away from the base camp as long as it is desirable.

By the use of motors for rapid transportation over the less interesting areas, it is believed that three seasons' work can be done in six months. The camel caravan will be sent ahead from place to place, thus acting as a movable base and as a reserve if the motor transportation does not prove as successful as is expected. The use of motor vehicles in this remote region is an experiment which should have considerable importance in demonstrating how accessible the country can be made in the future. The motors are equipped with all the latest devices and such a complete assortment of spare parts is being carried that it would be possible almost to construct a complete car if one was disabled. Mr. S. Bayard Colgate, who has charge of the motor transportation, is an expert in his line and has spent several weeks in the Fulton and Dodge factories familiarizing himself with every detail of the construction and repair of the cars.

Supplies of gasoline, oil, food and other essentials will be obtained every four or five days from the camel caravan which will be sent ahead from point to point as the field of operations is changed.

It is proposed to bring back a very complete record in motion pictures of the work of the

expedition, the life and customs of the people and the interesting features of the country. Mr. J. B. Shackelford, who is perhaps the foremost cinematographer of the United States, is equipped with three remarkable cameras which were invented by Mr. Carl Akeley of the American Museum of Natural History for natural history work. This camera can be leveled instantly without reference to the position of the tripod and with a turn of the wrist can be swung up and down, from side to side, or in any direction, thus obviating the clumsy panoramic device which is one of the most cumbersome features of the ordinary moving picture camera. A battery of lenses of all descriptions, including powerful telephoto lenses, will make possible the obtaining of animal photographs at long distances. Antelope, wild horses, wild asses and wild camels can be run down in the motor cars, and these exciting chases, which are a feature of hunting on the Mongolian plains, can be brought home in all their details. The expedition hopes to lasso many animals from the cars and send some of them alive to America. A complete record of the lives and customs of the Mongols, historically one of the most interesting peoples of the world, has never been attempted and this field has almost unlimited possibilities of the greatest scientific and popular interest.

Dr. Walter Granger, paleontologist of the expedition, ranks high in his profession throughout the world. Possibly no man is more familiar with the difficult technique of discovering and preparing fossils in the field than Dr. Granger. His many years of work in America on the evolution of the Eocene horse has brought to the American Museum of Natural History the finest collection of fossil horse material in the world. He also conducted extensive explorations in the Fayum Desert of Africa on the famous expedition under the direction of the distinguished president of the American Museum of Natural History, Professor Henry Fairfield Osborn. Dr. Granger has only recently returned from Eastern Szechuan, where he has been spending the winter investigating a fossil field not far from Wan hsien on the Yangtze River. This expedition has brought together an extremely inter-

esting collection of fossils among which the primitive elephant *Stegodon* is particularly well represented.

Dr. Charles P. Berkey, who is professor of geology in Columbia University, has been connected with so many important operations in America, and is so well-known to the geologists of the world that special mention of his activities would be superfluous. Dr. Berkey, who has charge of all the geological work of the expedition will carry on a reconnaissance of structural geology and physiography of the areas to be visited in Mongolia and lay out general plans for further geological work. His attention will be particularly devoted to the Tertiary features of the region in relation to its bearing on the problem of the development of primitive man.

Professor Frederick Morris is a former colleague of Dr. Berkey in Columbia University and until the first of March was professor of geology in Pei Yang University at Tientsin. Professor Morris is an expert topographer and will have charge of the mapping and survey work of the expedition as well as assisting in geological investigations. Probably no man in America is better equipped for this work because of his exceptional ability in sketching and his familiarity with map-making and all phases of topographical study. A wireless equipment has been obtained and the American Legation wireless station will send over the correct time each evening at 7 o'clock, so that the exact geographical position of the party will be obtained.

Mr. F. A. Larsen, who will act as field manager in Mongolia, will bring to the expedition the benefit of his thorough knowledge of the country and its people and be of the greatest assistance in helping to adjust the various difficulties, such as will inevitably arise.

Roy Chapman Andrews, the leader and organizer of the expedition as well as directing the general operations, will conduct zoological investigations in mammals, birds, fishes and reptiles.

The purpose of the Third Asiatic Expedition is to carry on a coordinated investigation of various areas in Central Asia which have remained scientifically unexplored. It is the

consensus of scientific opinion that the Central Asian plateau, including Thibet, Chinese Turkestan and Mongolia, was not only the point of origin and distribution for many forms of animal life which exist to-day in America, Europe and many parts of the world, but was also the so-called "cradle of the human race." Although its important relation to human ancestry has long been recognized, no coordinated scientific investigation has ever been conducted on a large scale. Its zoology, paleontology, geology and botany bear the most intimate relations to the ancestry of man and it is with reference to this problem, which is of world-wide interest, that the expedition will conduct its work. It will furnish material for the Great Hall of Asiatic Life which is now being added to the buildings of the American Museum of Natural History in New York City. The expedition also proposes to present to the Chinese government a duplicate series of its collections which it is hoped will be used as the basis of a National Museum of Natural History in Peking.

The cordial support which all the officials of the Chinese government have accorded the expedition and the facilities which have been given to it for prosecuting its work, indicate what a keen appreciation of the value of scientific work there is in China.

The Chinese Geological Survey for a number of years has been carrying on geological and paleontological explorations in various parts of China and has already become an institution of recognized importance throughout the world because of the high standard of its work. The survey has cooperated in the most friendly and scientific spirit with the Third Asiatic Expedition and a plan of operations has been agreed upon which is proving of great mutual benefit.

The expedition expects to return from Mongolia about October 1, 1922. At that time Professor Henry Fairfield Osborn, president of the American Museum of Natural History, will arrive in Peking with his wife and daughter to inspect the results of the work and to plan for future investigations.

Professor Osborn is one of the greatest living authorities on the evolution of man. His visit to Peking can not but be an important event in the scientific life of China.

Mr. Clifford Pope, assistant in zoology, will not accompany the expedition to Mongolia but will continue his studies of the reptiles, fish and batrachians of China. He has already obtained more than 10,000 specimens and will visit all the provinces of China before his work is completed.

Mr. James Wong, interpreter, will make an expedition to Szechuan Province while the main party is in Mongolia. His work will be an examination and reconnaissance of the caves along the Yangtze River preparatory to paleontological studies for the winter of 1922-23.

Mr. Harry R. Caldwell, assistant in zoology, will continue his zoological survey of Fukien Province during the summer.

ROY CHAPMAN ANDREWS

PEKING, APRIL, 1922

SCIENTIFIC EVENTS

THE UNIVERSITY OF HALIFAX

DETAILS of the plan recently announced for amalgamating all institutions for higher education in the maritime provinces of Canada into a central university at Halifax, with the assistance of the Carnegie Foundation, have been made public. Alumni of the various colleges at present are considering the proposal. The plan proposes:

1. That there should be formed in Halifax an overhead university connected with all the colleges, but not particularly with any one, which should do the work of graduate and professional schools for the provinces; that is, the work now carried on by Dalhousie University in law, medicine, dentistry and pharmacy, and that carried on by the Nova Scotia Technical College in engineering, should be done by the university, together with the junior and senior years and the scientific portion of the freshman and sophomore years of each college.

2. That the various colleges situated outside of Halifax, namely, Acadia, Kings, Mount Allison, St. Francis Xavier and University of New Brunswick, should move to Halifax, erect buildings of their own, provide dormitory facilities, class rooms, dining rooms, chapel and other needed buildings for their own students, and in general conduct the work in English, French, German, Latin, Greek, mathematics and history for the first two years, caring for the housing and discipline of their students.